DGW

Patent Application
USSN - 10/603,873
Atty. Docket No. 8119-90049

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	
David Peter Dennison	Group Art Unit: 3671
For: The Construction of Roads	Examiner:
Serial No.: 10/603,873	Hartmann, Gary S.
Filed: June 25, 2003	

TRANSMITTAL OF CERTIFIED COPY OF PRIORITY SOUTH AFRICAN PATENT APPLICATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Enclosed herewith please find a certified copy of South African Priority Patent Application No. 2001/0188 for the above to support Applicant's claim to priority under 35 U.S.C. §119 in the subject application.

Respectfully submitted,

WELSH & KATZ, LTD.

By: Thomas R. Vigil
Thomas R. Vigil
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Date: December 6, 2005

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DEPARTEMENT VAN HANDEL
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PATENT OFFICE
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF TRADE AND
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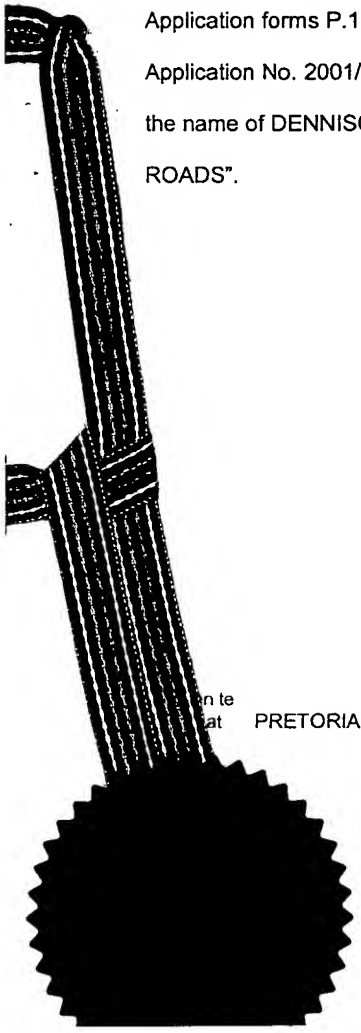

Application forms P.1 and P.3, provisional specification and drawings of South African Patent Application No. 2001/0188 as originally filed in the Republic of South Africa on 8 January 2001 in the name of DENNISON, DAVID PETER for an invention entitled "THE CONSTRUCTION OF ROADS".

CERTIFIED COPY OF PRIORITY DOCUMENT

n te
at PRETORIA in die Republiek van Suid-Afrika, hierdie 3 dag van November 2005
in the Republic of South Africa, this day of

.....
Registrateur van Patente
Registrar of Patents

BEST AVAILABLE COPY

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978
APPLICATION FOR A PATENT AND
ACKNOWLEDGEMENT OF RECEIPT
(Section 30(1) Regulation 22)

FORM P.1 (to be lodged in duplicate)

REPUBLIC OF SOUTH AFRICA
REVENUE
-8. 1.01 R 060.00
INKOMSTE
REPUBLIEK VAN SUID AFRIKA
HASR 370

THE GRANT OF A PATENT IS HEREBY REQUESTED BY THE UNDERMENTIONED APPLICANT ON THE BASIS OF THE PRESENT APPLICATION FILED IN DUPLICATE

21	01	PATENT APPLICATION NO 20010188

A&A REF: Y144-36 WB

71	FULL NAME(S) OF APPLICANT(S)

DENNISON, David Peter

ADDRESS(ES) OF APPLICANT(S)

DENNISON, David Peter

54	TITLE OF INVENTION

"THE CONSTRUCTION OF ROADS"

Only the items marked with an "X" in the blocks below are applicable.

- [ ] THE APPLICANT CLAIMS PRIORITY AS SET OUT ON THE ACCOMPANYING FORM P.2. The earliest priority claimed is
  Country: NIL No: NIL Date: NIL
- [ ] THE APPLICATION IS FOR A PATENT OF ADDITION TO PATENT APPLICATION NO 21 01
- [ ] THIS APPLICATION IS A FRESH APPLICATION IN TERMS OF SECTION 37 AND BASED ON APPLICATION NO 21 01

THIS APPLICATION IS ACCOMPANIED BY:

- [X] A single copy of a provisional specification of 17 pages
- [X] Drawings of 3 sheets
- [ ] Publication particulars and abstract (Form P.8 in duplicate) (for complete only)
- [ ] A copy of Figure of the drawings (if any) for the abstract (for complete only)
- [ ] An assignment of invention
- [ ] Certified priority document(s). (State quantity)
- [ ] Translation of the priority document(s)
- [ ] An assignment of priority rights
- [ ] A copy of Form P.2 and the specification of RSA Patent Application No 21 01
- [X] Form P.2 in duplicate
- [ ] A declaration and power of attorney on Form P.3
- [ ] Request for ante-dating on Form P.4
- [ ] Request for classification on Form P.9
- [ ] Request for delay of acceptance on Form P.4
- [x] Copy of Form P.1

74	ADDRESS FOR SERVICE: Adams & Adams, Pretoria

Dated this 5 day of January 2001

M ROTTEVEEL

ADAMS & ADAMS
APPLICANTS PATENT ATTORNEYS

The duplicate will be returned to the applicant's address for service as proof of lodging but is not valid unless endorsed with official stamp

REGISTRAR OF THE COURT OF THE COMMISSIONER OF PATENTS
DATE STAMP
2001 -01- 08
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REPUBLIC OF SOUTH AFRICA
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A&A P201

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PRETORIA

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978
DECLARATION AND POWER OF ATTORNEY
(Section 30 - Regulation 8, 22(i)(c) and 33)

FORM P.3

PATENT APPLICATION NO		
21	01	2001/0188

A&A REF: V14436 MR

LODGING DATE	
22	8 JANUARY 2001

FULL NAME(S) OF APPLICANT(S)	
71	DENNISON, David Peter

FULL NAME(S) OF INVENTOR(S)	
72	DENNISON, David Peter

EARLIEST PRIORITY CLAIMED	COUNTRY		NUMBER		DATE	
	33	NIL	31	NIL	32	NIL

NOTE: The country must be indicated by its International Abbreviation - see schedule 4 of the Regulations

TITLE OF INVENTION	
54	**"THE CONSTRUCTION OF ROADS"**

* I/We DENNISON, David Peter

hereby declare that :-

* 1. I/we am/are the applicant(s) mentioned above;

** 2. ~~I/we have been authorized by the applicant(s) to make this declaration and have knowledge of the facts herein stated in the capacity of of the applicant(s);~~

*** 3. the inventor(s) of the abovementioned invention is/are the person(s) named above ~~and the applicant(s) has/have acquired the right to apply by virtue of an assignment from the inventor(s);~~

4. to the best of my/our knowledge and belief, if a patent is granted on the application, there will be no lawful ground for the revocation of the patent;

**** 5. ~~this is a convention application and the earliest application from which priority is claimed as set out above is the first application in a convention country in respect of the invention claimed in any of the claims;~~ and

6. the partners and qualified staff of the firm of **ADAMS & ADAMS**, patent attorneys, are authorised, jointly and severally, with powers of substitution and revocation, to represent the applicant(s) in this application and to be the address for service of the applicant(s) while the application is pending and after a patent has been granted on the application.

SIGNED AT **DURBAN** THIS **4TH** DAY OF **JANUARY** **2001**

SIGNATURE(S)
(no legalization necessary)

* In the case of application in the name of a company, partnership or firm, give full names of signatory/signatories, delete paragraph 1, and enter capacity of each signatory in paragraph 2.
** If the applicant is a natural person, delete paragraph 2.
*** If the right to apply is not by virtue of an assignment from the inventor(s), delete "an assignment from the inventor(s)" and give details of acquisition of right.
**** For non-convention applications, delete paragraph 5.

A&A P203

A & A Ref No: **V14436 MR**

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PRETORIA

FORM P6

REPUBLIC OF SOUTH AFRICA
Patents Act, 1978

PROVISIONAL SPECIFICATION
(Section 30 (1) - Regulation 27)

21	01	OFFICIAL APPLICATION NO

20010188

22	LODGING DATE

8 JANUARY 2001

71	FULL NAME(S) OF APPLICANT(S)

DENNISON, David Peter

72	FULL NAME(S) OF INVENTOR(S)

DENNISON, David Peter

54	TITLE OF INVENTION

"THE CONSTRUCTION OF ROADS"

A&A P206

THIS INVENTION relates to the construction of roads.

The invention relates particularly to a stabilising body for use in the construction of roads of the type commonly referred to as tarmac roads and to a method of constructing such roads utilising this stabilising body.

Any reference hereinafter to a road must accordingly be interpreted as a reference to a road of the type known as a tarmac road.

The construction of roads, including also the repair of roads, requires the formation of a stable base upon which a final layer of material for forming the actual road surface is applied. The stable base can be formed in any one of many different ways that are already well known. As this does not form a part of the present invention, this is not

described in any further detail herein. The final layer of material, herein referred to as a tarmacadam layer, comprises generally a mixture of broken stone and tar, or a tar-like substance. The exact formulation of the tarmacadam layer is variable and generally is determined by the specific requirements of a road.

One of the major reasons for a road to "break up" is water seepage, which can cause the tarmacadam layer of the road to lift from its base. The failure of a road also can occur in extremely hot conditions when the tar, or tar-like component of the tarmacadam layer softens, allowing movement within the layer to occur, especially when heavy vehicles pass over the road, such movement resulting in rutting of the tarmacadam layer of the road and, eventually, breaking-up of the said layer. Also, particularly as a result of heavy vehicles passing over roads, the deformation of the tarmacadam layer of the roads due to the load of the vehicles acting thereon can cause reflective cracking to initiate within the said layer from the operative bottom side of the layer and through the propagation of reflective cracks formed, the break-up of the entire tarmacadam layer can result. It will be appreciated in the above regard that once the tarmacadam layer is broken up, the base of the road also will be exposed to being damaged.

It is an object of this invention to provide for the construction of a road within which the tarmacadam layer is less inclined to "break-up", particularly as a result of the occurrences explained above.

According to the invention there is provided a stabilising body for use in the construction of roads, which comprises a substantially rigid, planar body defining a multi-cell configuration between spaced operative top and bottom faces of the planar body, each cell being defined by a surrounding side wall extending between the said faces of the planar body.

According to one particular embodiment of the invention, at least some of the cells defined by the planar body have a base wall, on the bottom face side of the planar body. Each base wall further may define one or more projecting formation that projects towards the operative top face side of the planar body, each projecting formation comprising a continuously curved formation so that the base wall defines at least a continuously curved face profile when viewed in section.

The planar body may comprise a substantially square or rectangular body having complementary engagement formations defined along opposite longitudinal sides thereof, whereby similar stabilising bodies can engage one another for forming an extended continuous planar body. The complementary engagement formations typically are dovetail-like formations, although any other formations suitable for the purpose also can be defined as part of the body. It must be appreciate also that the outer perimeter profile of the planar body can define any other profile which will permit similar bodies to

be engaged with one another for forming an extended continuous body beneath the surface of a tarmacadam layer of a road constructed as described hereafter.

The individual cells forming the multi-cell configuration defined by the planar body may define a substantially square or a circular profile, the cells being arranged in any suitable arrangement within the perimeter of the planar body. However, the said cells also may define any alternative profile which may be deemed suitable for use within a stabilising body as herein envisaged.

Further according to the invention, all the cells forming the multi-cell configuration defined by the planar body may have a base wall, and one or more of these base walls may have projecting formations as defined above. The base wall of each cell may cover at least partially the operative bottom end of the cell and, preferably, the base wall of each cell covers the entire bottom end of its cell. Still further, the base wall of one or more selected cell may define an opening therein to permit the flow of liquid through the planar body, although it is envisaged also that suitable openings for this purpose can be defined in any other location within the planar body forming the stabilising body of the invention.

The projecting formations defined by the base walls of the cells forming the multi-cell configuration defined by the planar body particularly are profiled to define contained

spaces between them that are configured to prevent/reduce reflective cracking in the operative lower side of a tarmacadam layer which fills the cells of the planar body in the operative configuration of the stabilising body, when the tarmacadam material fills the said cells and extends above the top face of the planar body, which forms a base therefor. As such, the base walls may define an egg-crate-type configuration with the projecting formations defined thereby having an operative height equal to between 10 % and 50 % of the depth of the cells forming the multi-cell configuration defined by the planar body. Clearly, the configuration of the subsidiary cells may be greatly variable and may be determined by the requirements of a road surface being formed.

The cells forming the multi-cell configuration defined by the planar body may taper from the operative top to the operative bottom face side of the planar body, the side wall defining each cell being configured to provide the cell with the required side wall profile. As such, the side wall of each cell may be a substantially planar wall or may be a curved wall, typically a convexly or a concavely curved wall.

Still further according to the invention, the side wall defining each cell defined by the planar body may define at least one projecting formation that projects into the cell at a location between the operative top and bottom ends of the cell. The said side wall defining each cell particularly may define two or more parallel, adjacent rib formations that project into the cell. For a cell having a plurality of such rib formations projecting

into the cell, the rib formations, in combination with the side wall from which they project, preferably define a substantially continuously curved face that faces into the cell. The said rib formations particularly can serve to effectively lock the tarmacadam material within the cells, in the operative configuration of the stabilising body within a tarmacadam layer, while also serving to distribute forces acting within the layer and thereby reducing the possibility of reflective cracking within the material. The exact rib formation profile again is greatly variable and particularly will be determined by the requirements of a road with which the stabilising body is to be used.

For use, a plurality of stabilising bodies are arranged in an engaged configuration on a preformed base of a road to be constructed, thereby forming an extended continuous stabilising structure on which a required tarmacadam layer for forming a road surface can be applied. To secure the location of the stabilising bodies, anchoring means may be provided for, it being envisaged in particular that each stabilising body may define one or more anchoring formation that can cooperate with an anchoring element for anchoring the stabilising body on the base of a road being constructed. A tarmacadam layer can then be applied on the stabilising structure formed, the tarmacadam material particularly filling the cells forming the multi-cell configuration defined by the planar body of each stabilising body, while extending above the stabilising structure, the operative thickness of the stabilising structure typically comprising between 30 % and 60 % of the operative thickness of the layer being formed of the tarmacadam material. Clearly, the above

parameters are greatly variable and are determined particularly by the requirements of a road being constructed. Also, the application of the tarmacadam layer may be essentially conventional and it may be followed by a rolling process for the compaction thereof. It must be appreciated that the above application of stabilising bodies applies particularly to roads provided with a relatively thin tarmacadam layer, e.g. between 30 mm and 60 mm and that different parameters and arrangements can be provided for roads that have a relatively thick tarmacadam layer, e.g. in the order of 150 mm.

For a road having such a thick tarmacadam layer, a layer of stabilising bodies with cells having base walls can be positioned on the base of such a road. Alternatively, or in addition, a layer of stabilising bodies with open cells can be positioned a predetermined distance beneath the exposed surface of the tarmacadam layer being formed, eg. approximately 10 mm to 30 mm beneath the said road surface. The layer of stabilising bodies positioned on the base of the road will serve to reduce reflective cracking and the layer beneath the road surface will serve to reduce rutting, and resulting damage.

A stabilising body, in accordance with the invention, may be manufactured of any suitable material, it being envisaged in particular that the stabilising body of the invention can be formed of a material such as a nylon, or a suitable synthetic plastics material, having suitable rigidity characteristics. If formed of a synthetic plastics material, the stabilising body can be manufactured by a suitable plastics moulding process, such as

by injection moulding. They typical outer dimensions of the stabilising body may be up to 1,2 m by 1,2 m, whereas the thickness of the body may be between 10 mm and 50 mm, although the invention as herein defined must not be limited to these dimensions.

The invention extends also to a method of constructing a road which provides for the location of a stabilising structure as hereinabove envisaged and the application of a tarmacadam material within and above the stabilising structure to form a tarmacadam layer. The method of the invention accordingly extends to the use of stabilising bodies as herein envisaged for the construction of a road and in this regard it must be appreciate also that the method can be applied for the repair of a road.

The invention extends still further to a method of road construction which includes forming a base for a road in a conventional manner, forming a stabilising structure of stabilising bodies on the base of the road and then forming a tarmacadam layer of a tarmacadam material which fills the cells of the stabilising bodies and forms a layer above the stabilising structure. Clearly, this method of road construction and, particularly, the location and support of the stabilising structure, may be greatly variable and may be determined by the requirements of the road being constructed.

Further features of the invention are described in more detail hereinafter with reference to the accompanying diagrammatic drawings. In the drawings:

Figure 1 shows a schematic plan view of a stabilising body for use in the construction of roads, in accordance with the invention;

Figure 2 shows a detailed three dimensional view of a cell formation defined by the stabilising body of Figure 1;

Figure 3 shows a detailed plan view of a corner segment of the stabilising body of Figure 1;

Figure 4 shows a detailed cross sectional view of the detailed segment of the stabilising body as shown in Figure 3;

Figure 5 illustrates different side wall profiles for the cells defined by a stabilising body, in accordance with the invention; and

Figure 6 illustrates schematically in three dimensions the method of constructing a road, in accordance with the invention.

Referring initially to Figures 1 to 4 of the drawings, a stabilising body for use in the construction of a road, in accordance with the invention, is designated generally by the reference numeral 10. The stabilising body 10 comprises an integrally moulded,

substantially planar body 12, of nylon or a suitable synthetic plastics material, the body 12 defining a substantially square perimeter profile in plan view (see Figure 1). The opposite longitudinal edges of the body 12 define complementary engagement formations, 14.1 and 14.2 respectively, these formations extending around the entire perimeter of the body 12, as shown. The formations 14.2 define recess formations within which the formations 14.1 are snugly receivable, thereby permitting the inter engagement of similar stabilising bodies with the formations 14 of adjacent bodies engaging one another in a dovetail-like fashion. Through the inter-engagement of a plurality of similar stabilising bodies, an extended stabilising structure can be formed (see Figure 6), this aspect of the invention being described in more detail hereafter.

The planar body 12 defines a plurality of open-topped cells 16 which extend between the operative top face and the operative bottom face of the body 12, the operative bottom end of each cell 16 being blocked by a base wall 18. Each base wall 18 itself defines a plurality of operatively upwardly projecting formations 20, the formations 20 defining contained spaces between them, as is illustrated clearly in Figures 2 and 4 of the drawings. The effective height of the formations 20 typically is between 10 % and 50 % of the operative depth of the cells 16.

The side walls 19 defining the cells 16, in the particular embodiment of the invention as shown in Figures 1 to 4, are inclined as shown, thus defining cells 16 that taper from

the operative open top end thereof towards the base wall 18 thereof, although it must be appreciated in this regard that the exact configuration of the cells of a stabilising body, in accordance with the invention, is greatly variable. The cells 16 as shown define essentially a square profile when viewed in plan view, but it must be appreciated in this regard that the cells also can define any other perimeter profile, e.g. a circular profile, a hexagonal profile, or the like. Different profile cells can be arranged with respect to one another in an arrangement in which an equivalent configuration to that shown in Figure 1 is provided for.

It is envisaged also that stabilising bodies of the type can be provided with open cells, i.e. cells without a base wall, whereas the outer perimeter profile of the stabilising body of the invention also is greatly variable.

Referring particularly to Figure 5 of the drawings, there is shown four different configuration side walls that can define the cells of a stabilising body, in accordance with the invention. Figures 5A, 5B and 5D illustrate side walls that define a plurality of substantially parallel, adjacent rib formations 22 that will project into the interior of a cell with which they are associated. Figure 5C illustrates a concave side wall, which itself defines a projecting formation that will project into the space defined by a cell with which it is associated. It will be appreciated again that the overall configuration of the side walls defining the cells of a stabilising body, in accordance with the invention, is

greatly variable and that the side walls can be associated with various different projecting formations that, in use of the stabilising body of the invention, can serve as anchoring formations as is described in more detail hereafter.

As illustrated in Figure 1 of the drawings, anchoring holes 22 are defined in selected formations 14.1 near the corners of the planar body 12, the anchoring holes permitting anchoring of the stabilising body on a support base, typically by means of metal stakes, or the like. Further anchoring holes also may be provided within the body 12, whereas passages leading through the base wall 18 associated with one or more cell defined by the body 12 also may be defined, for permitting the passage of a liquid through the body 12.

For use, and referring particularly also to Figure 6 of the drawings, a plurality of stabilising bodies 10, through their inter-engagement, can form an extended stabilising structure that can cover the entire base for a road to be constructed, the cells 16 defined by the stabilising bodies 10 facing operatively upwardly so that the tarmacadam material for forming the tarmacadam layer of the road to be constructed, when applied on the stabilising structure, will fill the cells 16 and form a continuous layer above the stabilising structure. Figure 6 illustrates a typical stabilising structure formed on a stable base 30 for a road, the stable base 30 being formed in any conventional manner. After the location of the stabilising structure through the inter-engagement of a plurality of

stabilising bodies 10 and anchoring of the bodies 10 to the base 30, a tarmacadam layer 32 of a tarmacadam material is applied on the stabilising structure, filling the open cells 16 defined by the individual stabilising bodies and forming a continuous layer above the stabilising bodies, it being envisaged in particular that the total thickness of the tarmacadam layer 32 will be approximately two times the effective thickness of the stabilising structure, as defined by the stabilising bodies.

The application method of the tarmacadam material can be conventional and the layer formed can also be compacted in a conventional manner for finally forming a stable tarmacadam layer. It will be appreciated in the above regard that the overall method of constructing a road, including the formation of a tarmacadam layer as envisaged above, can be associated with various other steps and processes that are commonly associated with the construction of roads.

By the provision of the stabilising structure, water seepage that could otherwise cause a tarmacadam layer to lift and break-up is effectively dealt with, while the stability provided within the tarmacadam layer, by being partially accommodated within the stabilising structure, will reduce material movement that could otherwise occur as a result of softening of the tar component of the tarmacadam material when exposed to elevated temperatures. The contained spaces between projections 20 defined by the base walls 18 of individual cells 16 also serve to contain the tarmacadam material therein

and in effect serve to dissipate the tensile stresses within the material layer when a road surface is exposed to heavy loads, thereby reducing the possibility of reflective cracking developing, which is also commonly associated with tarmacadam layer break-up. By reducing or eliminating reflective cracking, the possible propagation of cracks formed and that can eventually result in break-up, is thus greatly reduced, providing for a more stable road structure having a longer life.

The rib formations 22 serve to anchor the tarmacadam material within the cells, while also serving to dissipate loads and, as such, reduce the possibility of reflective cracking occurring.

The use of stabilising bodies within the construction of roads as above described particularly provides for the construction of roads having a tarmacadam layer that is relatively thin, for example between 30 mm and 60 mm. However, it is envisaged that stabilising bodies can be used in conjunction with roads having significantly thicker tarmacadam layers, up to 150 mm, or the like. For the latter application, open cell stabilising bodies can be utilised a predetermined distance beneath the exposed road surface of the road being formed, these bodies thus being spaced from the base of the road. These stabilising bodies can be effective to reduce potential rutting. A further stabilising structure formed of stabilising bodies having closed cells can additionally be

placed upon the base of such roads, these particular stabilising bodies serving particularly to reduce reflective cracking.

It must be appreciated in the above regard that the mode of use of stabilising bodies within the construction of roads and also for the repair of roads is greatly variable. In order to obtain optimum results within the construction of a road and particularly in order to obtain optimum qualities for the tarmacadam layer of a road, the optimum configuration of stabilising bodies must be established, particularly through experimentation. The main objective clearly will be to deal with water, reflective cracking and rutting.

The Applicant believes that with the use of stabilising bodies as proposed, a road having a substantially longer life will be provided for, thus in the long term effectively reducing the cost associated with the construction and maintenance of roads. For different applications, the specific design and construction of stabilising bodies can be greatly varied and the invention extends also to such different configuration stabilising bodies which will still incorporate the essential principles of the invention as herein defined. It is envisaged still further that stabilising bodies may define flow paths for leading away water from beneath the tarmacadam layer of a road, which is required in order to ensure that this tarmacadam layer cannot lift from its base and thereby break-up.

The stabilising bodies of the invention may also be selectively used within road construction, for example in road segments that are excessively exposed to traffic and/or to heavy traffic, such as in road intersections, and the like. Stabilising bodies also are particularly suitable for use in conjunction with road maintenance which invariably is associated with areas of roads that are naturally unstable. Stabilising bodies also can be used for various other applications where the provision of a road-like surface, or other suitable surface, is required and potentially also within the construction of roads that are not specifically tarmac roads, but where stabilising bodies can serve to stabilise the upper material layer of the road that forms the road surface.

DATED THIS 5TH DAY OF JANUARY 2001

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APPLICANTS PATENT ATTORNEYS

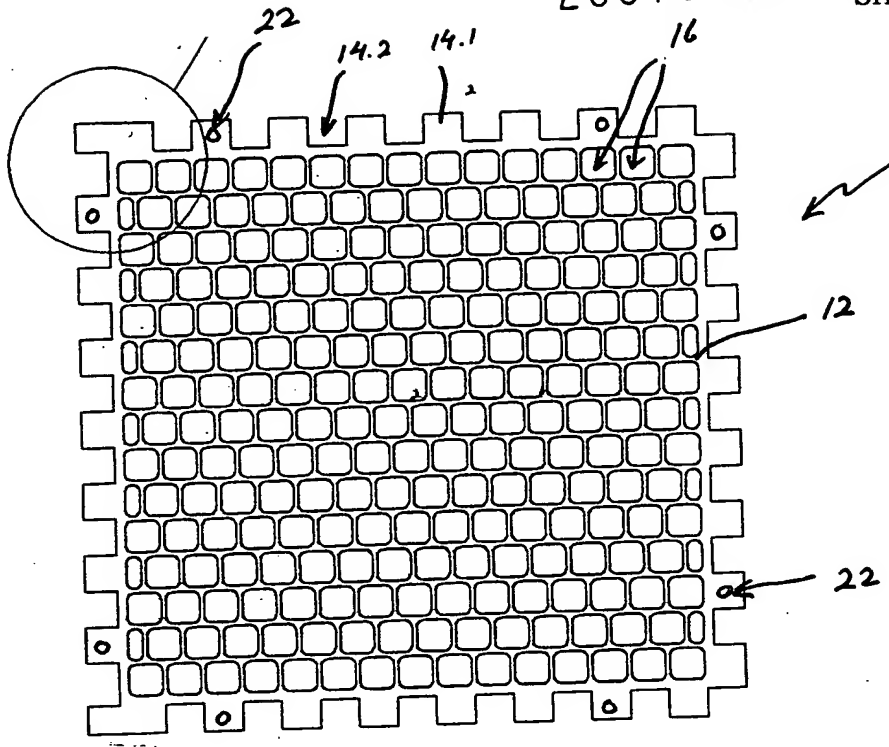

FIG 1

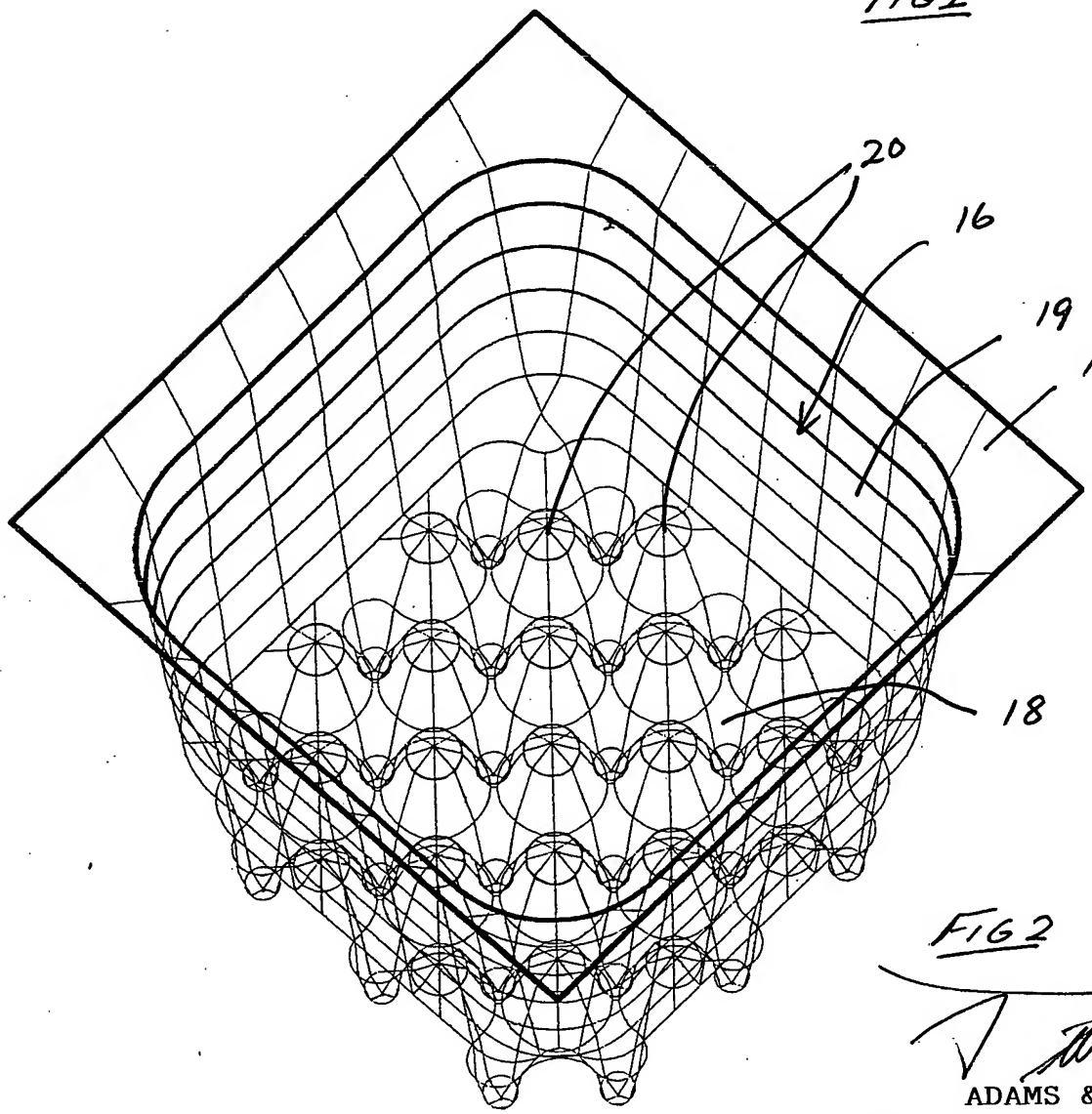

FIG 2

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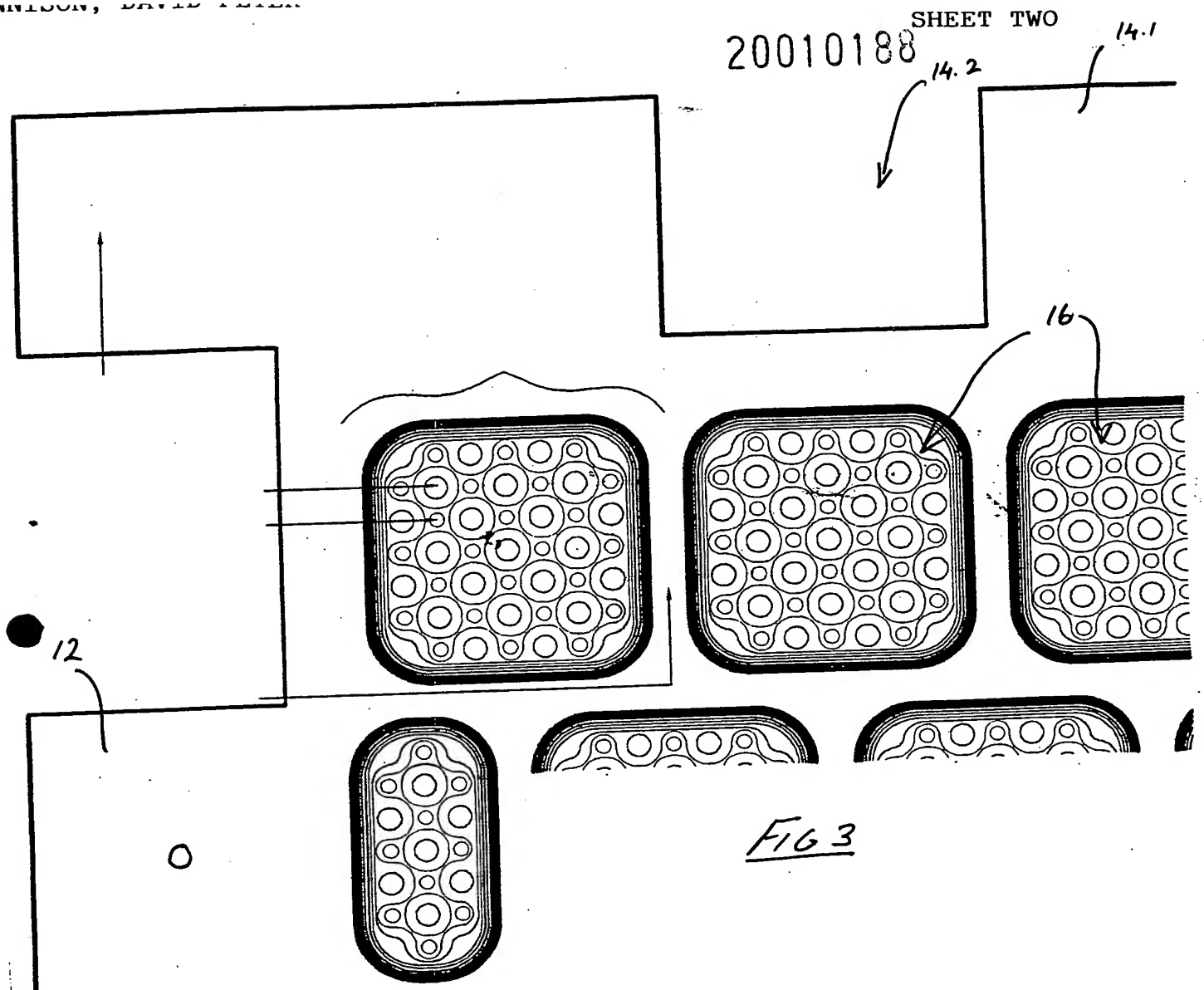

FIG 3

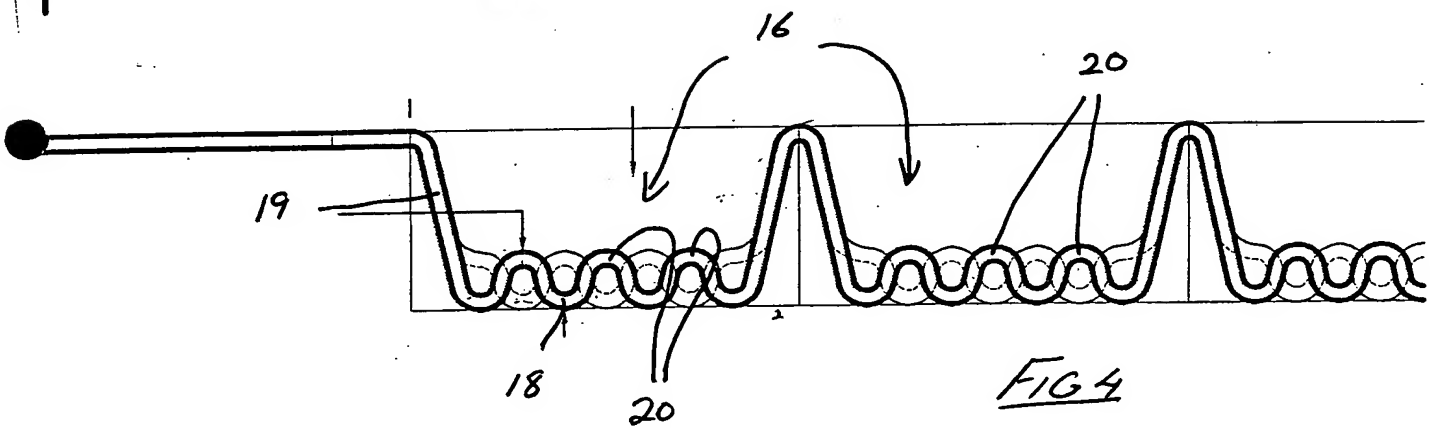

FIG 4

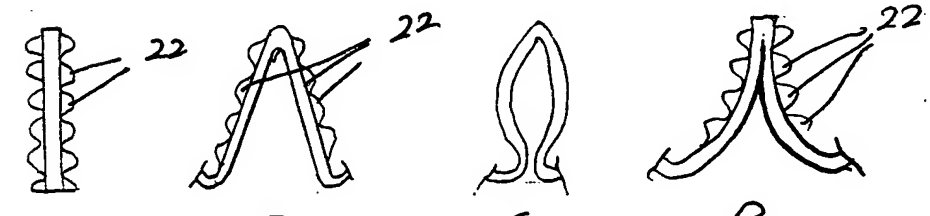

FIG 5

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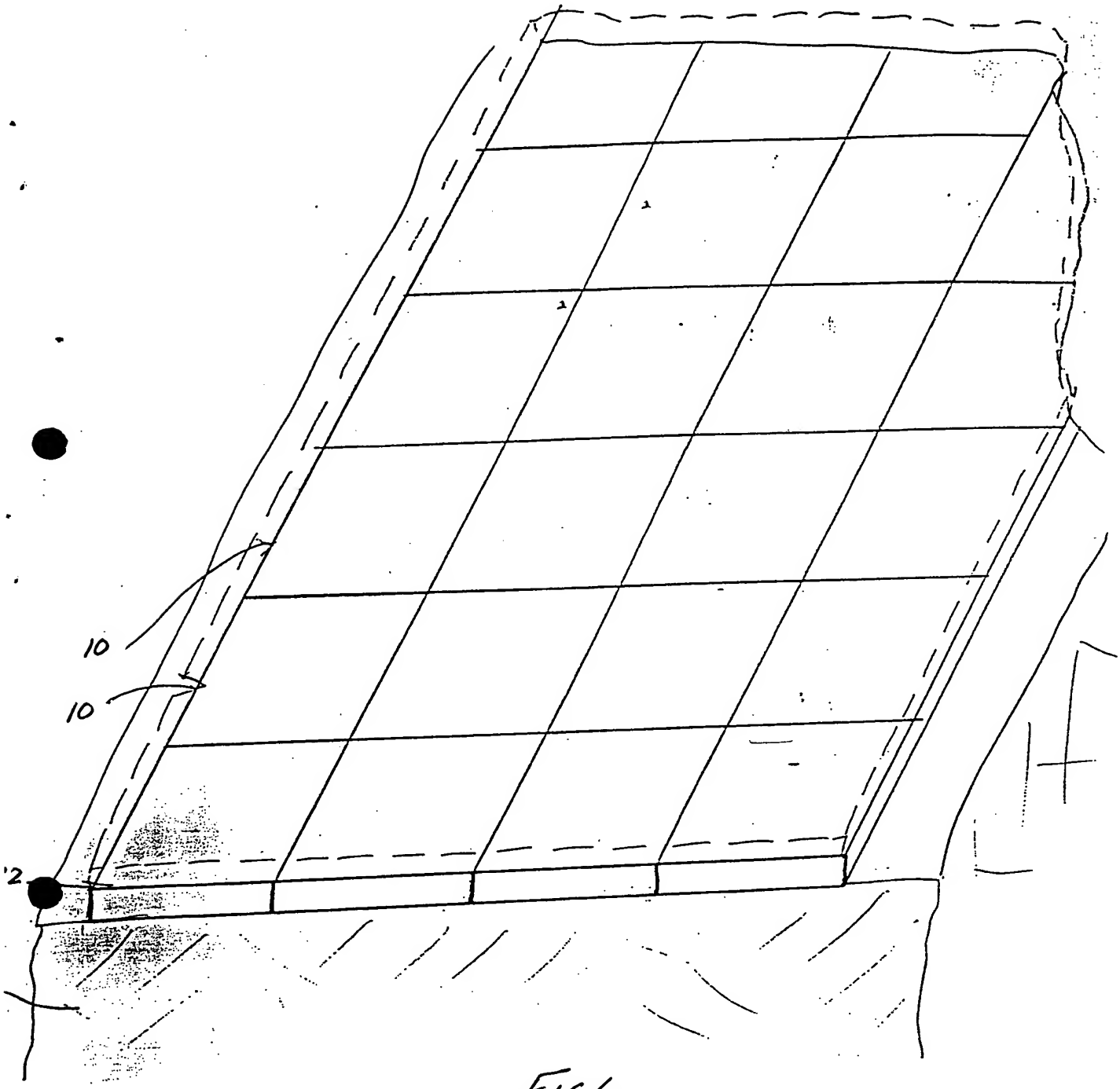

FIG 6

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